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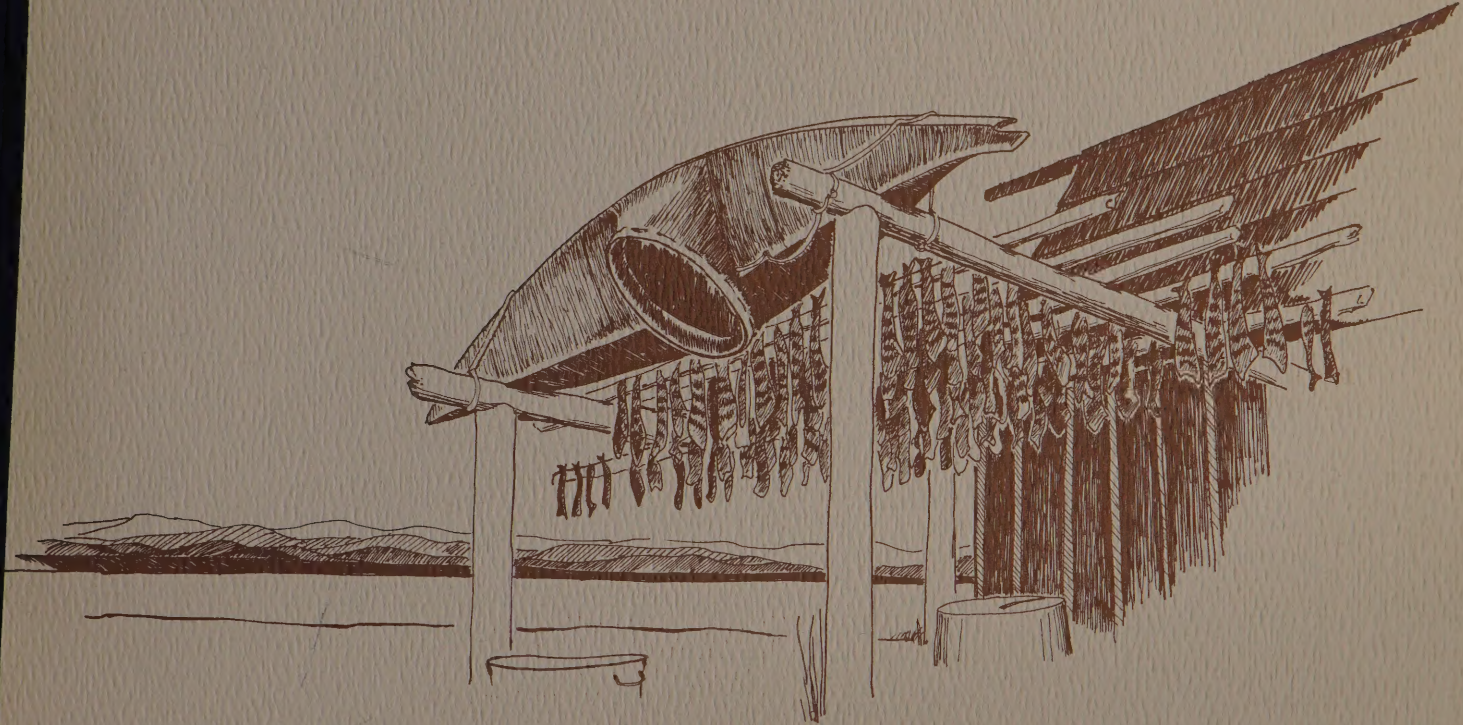
THE CENTER FOR NORTHERN STUDIES

GENERAL INFORMATION BULLETIN



The raven is found throughout the Far North, wherever there is tundra or boreal forest. Lacking special adaptations such as protective coloration or strong talons, the raven survives on intelligence and adaptability. Ravens have recently become common in northern Vermont. The Center for Northern Studies has taken the raven as its insignia and as the name of its newsletter.

The Center for Northern Studies is a private, non-profit institution for research and education in all aspects of the environment of the Far North, including history and cultural patterns of northern peoples.

Since the Far South is in many ways complimentary to the Far North, The Center is also concerned with the Antarctic and Subantarctic regions.

The orientation of The Center for Northern Studies is academic. The Center is strongly concerned with the conservation and wise utilization of the resources of the polar regions. However, we consider our role to be in the collection and dissemination of information which will contribute to this end. We are not a conservation society or an environmental pressure group.

This booklet has been prepared by the staff of The Center for Northern Studies as an introduction to the special world of the polar regions, and as a guide to the concepts on which the program of The Center for Northern Studies is based. Additional information on current projects and programs can be obtained from:

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THE POLAR REGIONS

The polar regions as we define them include a land area of some 15 million square miles, about one quarter of the land surface of the face of the earth. Yet the polar regions contain less than one per cent of the world's population, and vast areas of the Far North and in Antarctica are totally unpopulated.

The Polar regions also include almost limitless seas, some permanently covered by the polar ice packs, others navigable and rich with the greatest concentrations of sea life in the world.

With the exception of the Amazon basin and some of the larger deserts, virtually all of the major wilderness areas in the world lie within the polar regions. Even now, the polar regions are vast, almost continuous areas of pure wilderness, capping both ends of the globe and punctuated only by a few towns, industrial areas, and military and scientific stations, most of them minuscule by the standards of the rest of the world.

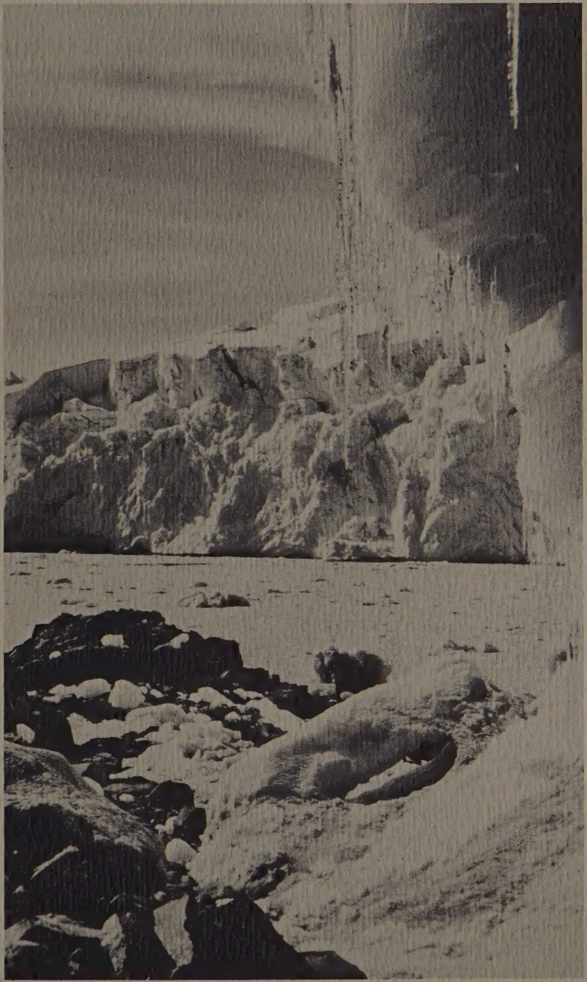
One of the characteristic features of the north polar regions when compared with temperate and tropical portions of the world, is the comparative uniformity of the polar environment. A large proportion of the species of boreal and arctic plants and animals are of almost universal occurrence throughout the entire Far North. In other cases, a complex of closely related species forms a circumpolar distribution pattern. Other features held in common by most Far Northern areas are a similar history of recent glaciation and a general similarity of climate and weather patterns.

Because of the comparative uniformity of the Far Northern environment, information gained through research in one part of the Arctic or Subarctic is often applicable to other northern areas thousands of miles away. In no part of the world is international cooperation in scientific efforts of more potential value than in the Far North.

There is less marked similarity between the biotic environments of the northern and southern polar regions, but studies in Antarctic climatology, glaciology, and geology have provided great insight into the history of the Far North.

The arctic tern has the longest migration route of any known bird. It breeds in the coastal areas of the Far North and winters in Antarctic waters. It may cover a distance of 11,000 miles between its summer and winter ranges.

Northern Vermont 15,000 years ago? Actually, this is a sea ice front on Anvers Island, Antarctica. Much of the north polar region was covered by ice sheets such as this only a few thousand years ago.



SOME DEFINITIONS

The Arctic includes the cold, largely ice-covered seas that cover the northernmost part of the globe, the strip of treeless tundra that almost completely encircles the polar sea, and the great inland ice cap of Greenland. To the south, the tundra gives way to forested regions. The timberline, the boundary between forest and tundra, makes a reasonable southern border to the Arctic. Another definition sometimes used is that the Arctic is the area north of the isotherm for 10° C (50° F) for the warmest month of the year. Since the timberline is correlated with summer temperatures, the two definitions are essentially the same. A timberline also occurs on some mountains to the south of the Arctic limit. The alpine tundra of these mountaintops shows more or less similarity to arctic tundra.

There is no general agreement on the limits of the Arctic seas, but most definitions depend on the distribution of sea organisms.

The Subarctic is the vast circumpolar belt of northern forest, composed primarily of conifers, aspen, and birches. In contrast to the Arctic, the climate of the Subarctic is predominately continental, and it is characterized by comparatively warm summers and often extremely cold winters. The coldest temperatures in the northern hemisphere, over 90 degrees below zero Fahrenheit have been recorded in the forested portions of eastern Siberia.

Over half of the land area of the polar regions lies within the Subarctic, and the vast majority of all people living within the polar regions live in the Subarctic, often in comparatively large cities such as Fairbanks, Alaska, or Yakutsk, USSR. However, vast areas of the Subarctic are almost unexplored.

The southern boundary of the Subarctic is not as clearly delineated as is the Arctic. A reasonable definition is: that area in which mean temperatures are above 10° C for no more than four months of the year, and are below freezing for at least one month. There is little agreement on the maritime limits of the Subarctic.

The Antarctic is the frozen, almost completely ice covered continent at the southern end of the world, and the surrounding ice-covered islands and frozen seas. Although large areas in the Antarctic are essentially lifeless, other parts contain a large and fascinating biota. Since much of the Far North was covered by an ice sheet similar to that which now blankets the Antarctic only a few thousand years ago, much can be learned about the history of the Far North through Antarctic studies.

The Subantarctic is a poorly defined region of almost limitless cold seas of the Southern Ocean, stretching northward to the Antarctic Convergence an area where cold Antarctic waters dip beneath the warmer waters of temperate regions. A few of the loneliest and most isolated islands in the world are the only land found within the Subantarctic. The vast, bleak seas of the Southern Ocean are incredibly rich with sea life, from micro-organisms to the greatest whales. In the future, the world may be dependent for much of its food supply on these waters.

Alpine fireweed is one of the many species of flowering plants found throughout the Arctic tundra, in both the Old and New World. Related to evening primroses, the plants bear brilliant rose flowers over two inches in diameter.

THE POLAR REGIONS IN THE MODERN WORLD

Although the polar regions have been commercially important as sources of furs, fisheries products, and a few minerals for hundreds of years, it is only within the past few decades that a general recognition of the potential economic significance of the polar regions has come about. Now, every year, major discoveries and developments in the polar regions land with increasing impact on the economy of the industrialized nations of the world. The proposed oil pipeline in Alaska would be one of the largest engineering projects in history. A multi-billion dollar plan to build a man-made lake larger than Lake Erie in Alaska has been seriously proposed. Iron, uranium, and other minerals in Canada, gold, coal and oil in Siberia, geothermal power in Iceland, and hydroelectric power throughout the Far North are only a few examples of the invasion of the polar regions by modern technology.

Many tundra plants are actually miniature trees. This dwarf willow, one of the commonest woody plants of the Far North, is only about 5 cm. tall.

Yet we have only begun to scratch the surface.

To give only one example of the possible direction of future development in the polar regions: some 98 per cent of all the fresh water known to exist on the face of the earth is frozen in the polar ice caps of Antarctica and Greenland. Methods of tapping these potential water sources are now only in the dreaming stages. But who can doubt, with the increasing demand for fresh water, that serious proposals for the utilization of this almost unlimited source will be made in the not so distant future.

There is also the possibility that the major impact of the polar region on future society will be outside the control of man. For example, we do not yet know the causes of the periodic waxing and waning of the polar ice caps, but we do know that it depends on a fragile balance of climatic and other factors. We also know that changes in the extent of polar ice can take place over a relatively short period of time, and that there is evidence that our present warm period may be nearing an end. During the last ice age most of Canada and the U.S. as far south as New York, Omaha, and Seattle were covered with glacial ice up to a mile or more thick. On the other hand, if the present glaciers would melt, seas would rise 100 feet or more inundating many of the major population centers of the world.

The fact is that we do not have the basic information necessary to allow us to handle the potential of the polar regions with wisdom and consideration for the future. It is the gathering

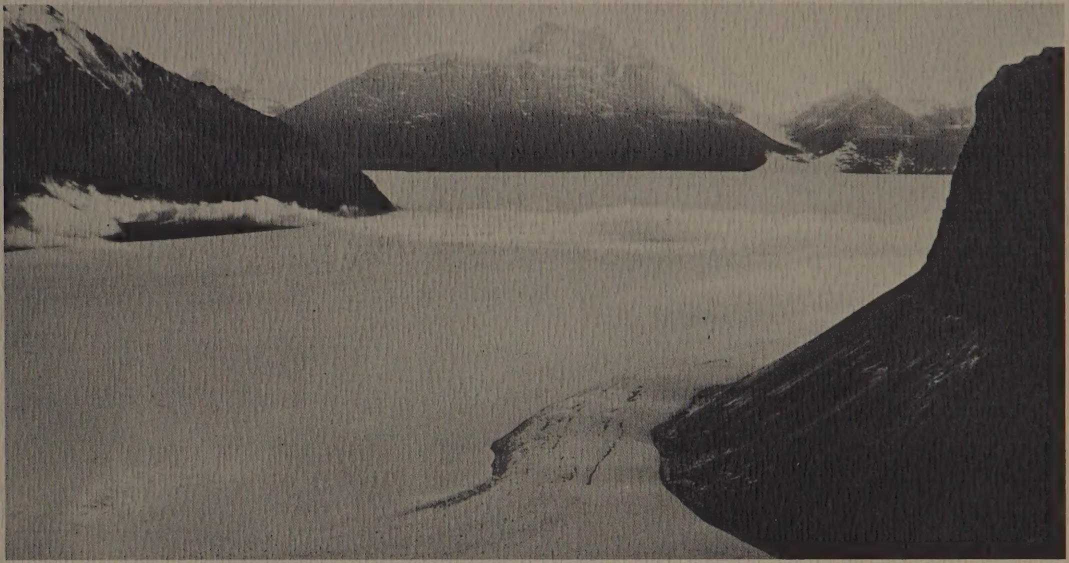
Even gross pollution can be picturesque. This abandoned narrow gauge railroad near Council, Alaska seems to be slowly being reclaimed by the tundra. Unfortunantly, it is being replaced in many northern areas by more extensive and more virulent forms of waste and pollution.

and dissemination of this information that is the major concern of The Center for Northern Studies.

SCIENCE, ART, AND THE POLAR REGIONS

The economic aspects of the future of the polar regions have been treated first, since this area seems to be the one of immediate concern to most people. However, the really great contributions from the polar regions to future society may well be in areas such as aesthetics or basic knowledge of the nature of the universe. It is desperately important that these potentials not be lost as a result of short-sighted economic considerations, as has happened throughout much of the tropical and temperate regions.

The polar regions have not yet found many of their great poets or painters, at least not from western society. Perhaps this is simply because of the isolation and difficulty of access of the polar lands. Perhaps it is because western man has viewed the polar regions mainly for their potential for exploitation. A more likely explanation is that the beauty of the polar regions is so awesome, so far beyond the scale of most human experience, that most talents are unequal to it.



The "dry valleys" of Antarctica may be over a mile deep and ten or more miles wide; they are fully comparable to the Grand Canyon, but cover a more extensive area. The valleys are almost totally devoid of multicellular life.

Shown is the upper portion of Taylor Valley, where the mountains are beginning to dip under the limitless expanse of the Antarctic ice cap. These valleys had hardly been seen by human eyes until the mid 20th century.

However, it is true that few people who spend long periods of time in the polar regions come away unmoved by the magnificence in which they have lived, even though they may have difficulty in articulating their feelings. The human race needs the emotions engendered by the overwhelming beauty, wildness, and power of the polar landscape. Its loss would be the loss of part of ourselves.

People now alive remember Africa as The Dark Continent, an almost limitless area of wilderness populated by wild tribes and unknown animals. This wilderness is now "preserved" in a few scattered National Parks and Game Preserves, many of which are themselves endangered. Will the polar regions be like this in 50 years? If we are to ensure that they will not, we need more knowledge, a greater awareness that the grandeur of the polar regions is matched by the fragility of their environment.

In the field of scientific investigation, the contributions to human knowledge made by scientists working in the polar regions have often been disproportionately large when viewed within the context of the number of workers and amount of funding committed for research in these areas. Much of this is due to the nature of the polar environment itself.

The gyrfalcon, the great pale falcon of the Arctic. In the days when falconry was the favorite sport of the nobility, a gyrfalcon was worth a king's ransom, and the species was eliminated from parts of northern Europe.

An Eskimo woman of St. Lawrence Island wears a coverall made of ribbon seal skin, in the Siberian fashion. This picture was taken in one of the few remaining idglus, huts of turf, whalebone, and stone, remaining in western Alaska.

For example, the polar regions contain simplified and idealized ecosystems in which the relationships between organisms and their environment can often be elucidated in fine detail. From studies of this sort, general ecological principals have often emerged.

Environmental scientists have made major contributions to the study of man made pollutants by studying their capacity to penetrate the pristine environment of the poles. (DDT residues have been found in significant amounts in Antarctic penguins).

Glaciologists and climatologists hope to find in the polar regions the answers as to why much of the presently habitable portion of the earth's surface has periodically been engulfed in great polar ice sheets.

Geophysicists and astronomers often find outstanding opportunities in the polar regions to study such diverse phenomena as the earth's magnetic field, radiation belts in the earth's upper atmosphere, and the mechanisms of plate tectonics.

Even scientists concerned with extraterrestrial life are concerned with the polar regions. The Dry Valleys of Antarctica probably have the nearest equivalent on earth to the Martian environment.

POLAR PEOPLE

The forbidding and seemingly limitless stretches of sea and ice in the Antarctic were never seen by human eyes until the last century or two. Their human story involves only recent people from western cultures. Although the annals of Antarctic exploration are a fascinating story, the real area for human studies in the polar regions is in the Far North, where culture upon culture has risen and been superseded for untold thousands of years.

In fact, a case can be made that western civilization itself is a product of the polar environment. Our art, agriculture, even religion may have their roots in the advanced paleolithic cultures that flourished in Europe and the Middle East toward the end of the last glacial period. At that time, the environment of much of Europe was polar, and northern animals such as reindeer were the fare of the ice age hunters. Remnants of cultures that may have been quite similar to that of our European ancestors are still found in the lands that border the polar sea.

It seems likely that the story of man's first invasion of the New World will come out of Artic Alaska, where the Bering Land Bridge was once the gateway to the western hemisphere.

More recent northern peoples have also made their mark on our society.

Much of the framework of our modern legal and political system was beaten into shape on the bleak plains of Iceland and Scandanavia a thousand years ago, in an attempt to keep some control over the lawlessness of the Viking Age. At the same time, much of the ancient European literature survived the Dark Ages in the distant haven of Iceland, where it was augmented by the Norse literature, including the story of western man's first colonization of the New World.

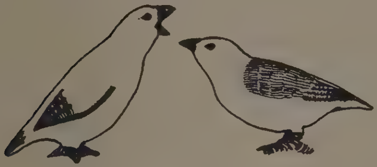
However, the non-western cultures of the Far North are of even greater interest. Most of the Far North is hardly the hostile, bleak environment envisioned by those whose orientation is primarily to the temperate zone. The polar environment is a challenge; the challenge must be met with intelligence and adaptability, but northern lands hold riches for cultures that can adapt. It is not surprising that many northern peoples combine toughness and adaptability with sensitivity and intelligence that lifts their culture far above the "primitive" level. It is no accident that northern cultures have generally been most successful in maintaining some vestiges of their integrity in the face of pressures from technological society.

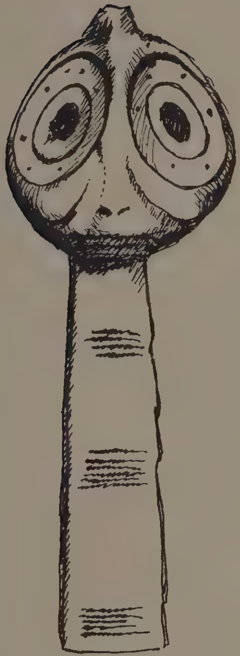
When northern cultures are discussed, many people think only of the Eskimo. Remarkable as this culture may be, it is only one of many in the Far North. There are also Lapps, Samoyede, Chuckchi, Athapascan, and many, many other peoples of the Arctic and Subarctic. Even among the Eskimo, there are a number of subcultures, and these have evolved, changed, and migrated a great deal during the past few hundred years.

Taken together, northern peoples fill a large, colorful, and fascinating chapter of the study of the human race.

An Eskimo hunter with a bearded seal (oogruk) killed on the pack ice of the Bering Sea. As well as food, seals provided the Eskimo with seal oil for heating and cooking, and the skin was used to make footwear and rope such as the coil shown in the picture. Many of the techniques used by native peoples of the Far North for making the most of what the environment provides are rapidly being lost.

Long before the introduction of steel tools, people of the arctic coasts were expert carvers of walrus ivory. To the right is a knife handle from St. Lawrence Island, attributed to the Okvik culture, which may have flourished about the time of Christ. Below are a pair of show buntings, carved by a modern Eskimo.





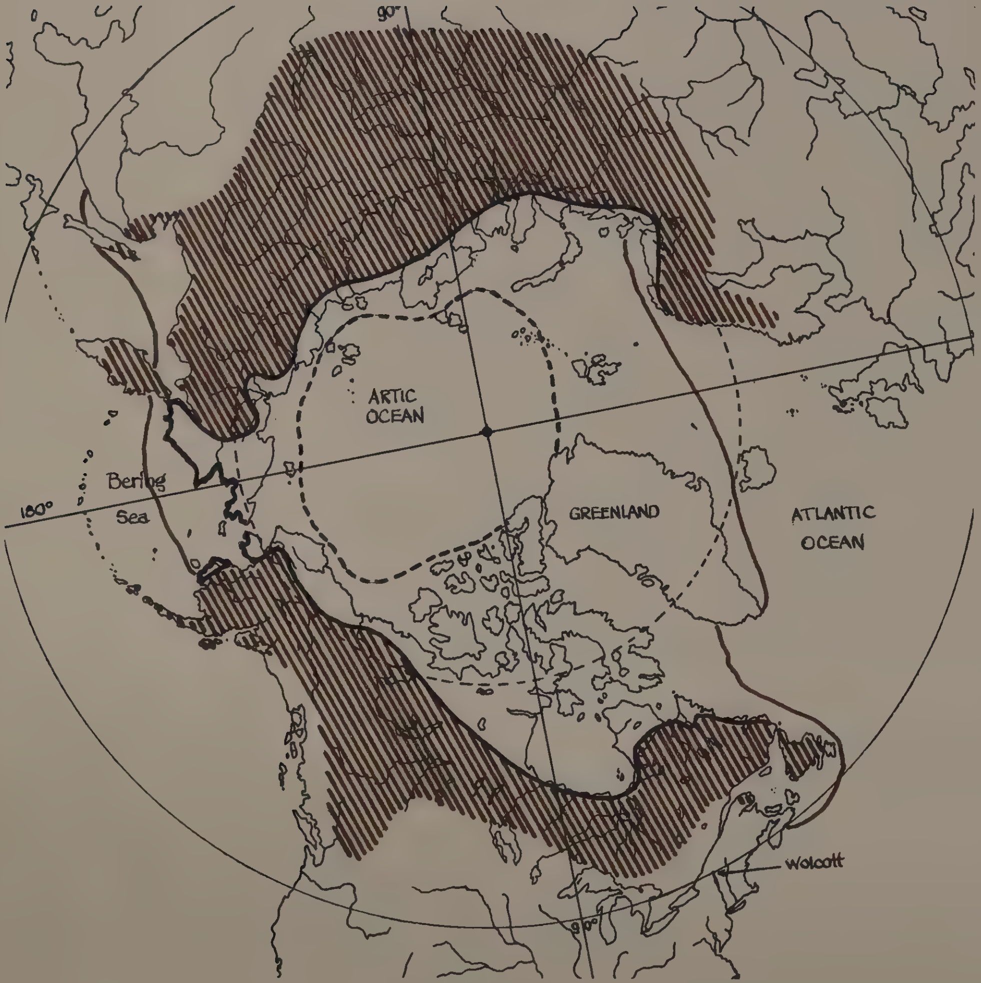
THE NEED FOR THE CENTER FOR NORTHERN STUDIES

A number of institutions concerned with interdisciplinary studies in various regions of the world have recently been started. Courses in such fields as Asian or Latin American Studies are now an accepted part of many curricula.

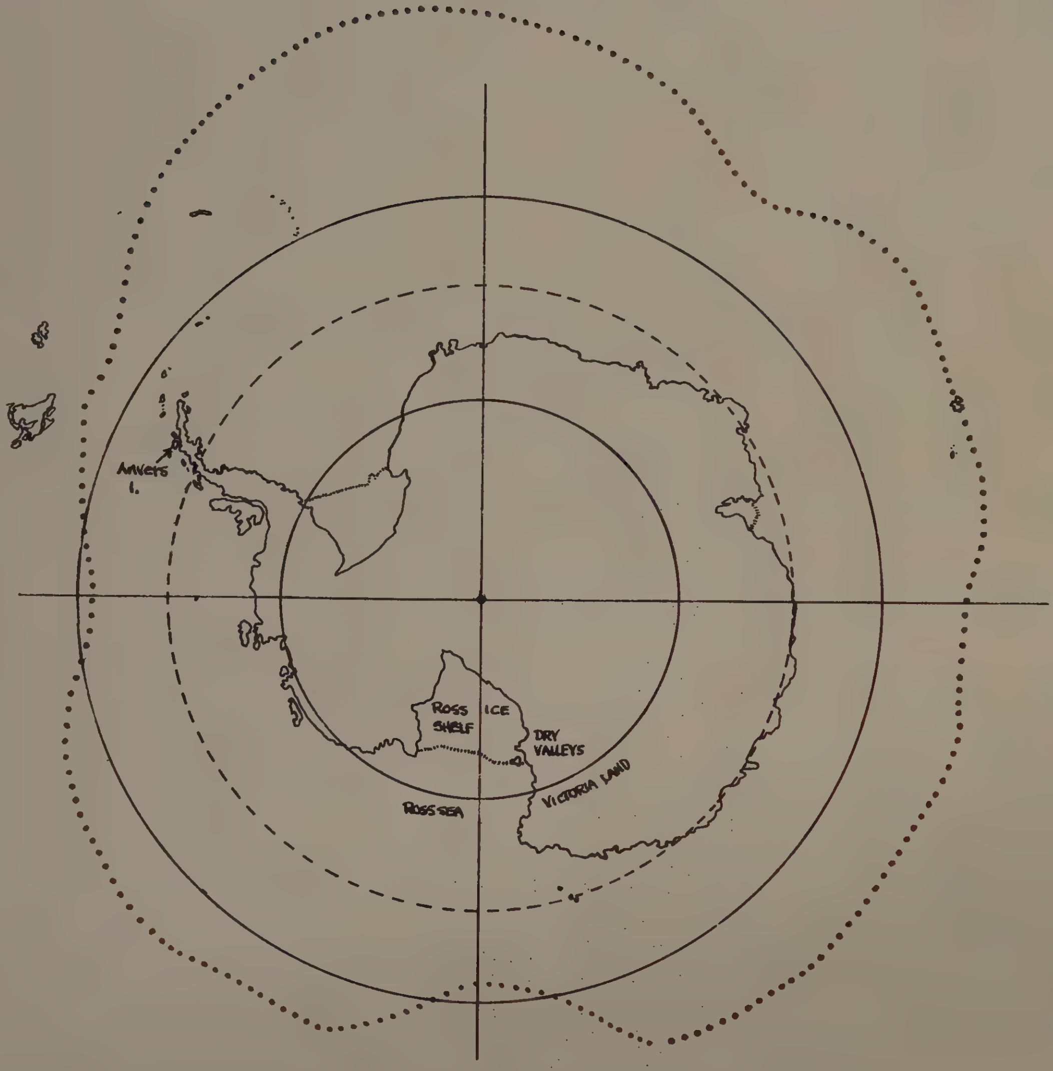
With regard to northern studies, most institutions concerned with this field are mainly interested in research and graduate level education. There is little opportunity for students, at least in the U.S. to participate in a program aimed at developing a broad, interdisciplinary view of the polar regions. With the current lack of government support of polar research in the U.S., the opportunities for students to gain field experience in polar regions is limited.

But the need for programs of this type is pressing. With the present emphasis on the development of the polar regions, the next few years are critical. It is vitally important that the people who will be instrumental in deciding the fate of the polar regions be broadly trained, so they are able to appreciate the special problems and potentials inherent in the polar environment.

It is to fill this need that the Center for Northern Studies has been founded. The Center's goal is to provide an opportunity for people to develop a broad concept of the northern environment as a whole. The Center will offer research and field study opportunities, formal course work, seminars and discussion groups, and an opportunity for day to day contact among people who are concerned with the polar regions.



Polar view of the Far North. The shaded area is the region normally considered to be the Subarctic, while the Arctic is left unshaded. The broken line indicates the approximate edge of the permanent polar pack ice, while the solid line gives the approximate normal limit of seasonal ice. Note the remarkable southward dip of polar conditions, both terrestrial and marine, in eastern North America. It would be appropriate to indicate an "island" of Subarctic conditions in northern New England, where climatic and biological conditions are comparable to other typical Subarctic regions.



Polar view of the Far South. Areas enclosed by the thin dotted line are floating sheets of continental ice. The continent itself is almost entirely ice covered, with only the dry valleys and a few "nunataks" (mountain peaks which penetrate the ice cap) exposing bare rock and soil. There is no universally accepted delineation between the Antarctic and the Subantarctic, but most of the seas that are normally ice free and the islands therein are commonly considered to be in the Subantarctic. The Antarctic Convergence, shown by the heavy dotted line, is a reasonable northern limit to the Subantarctic.

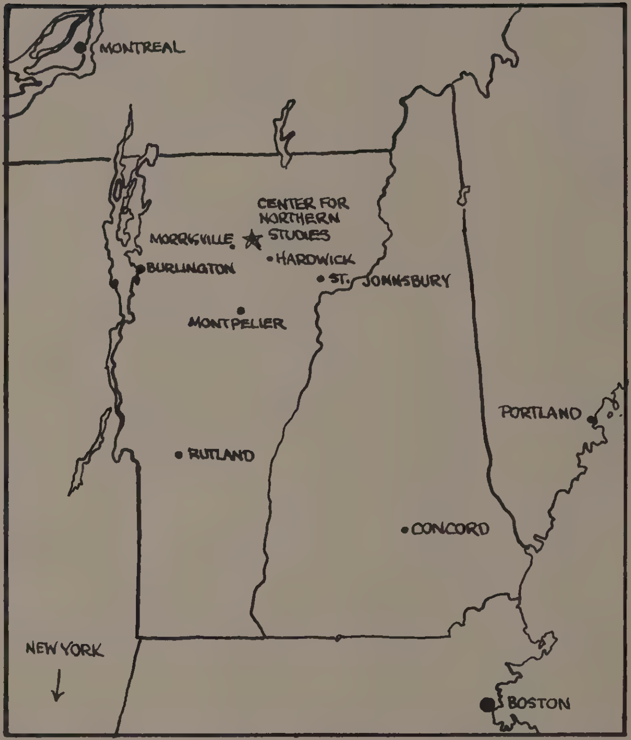
The Antarctic regions are a mirror image of the Far North: a frozen continent surrounded by seas, as opposed to a frozen sea surrounded by land.

LOCATION OF THE CENTER FOR NORTHERN STUDIES

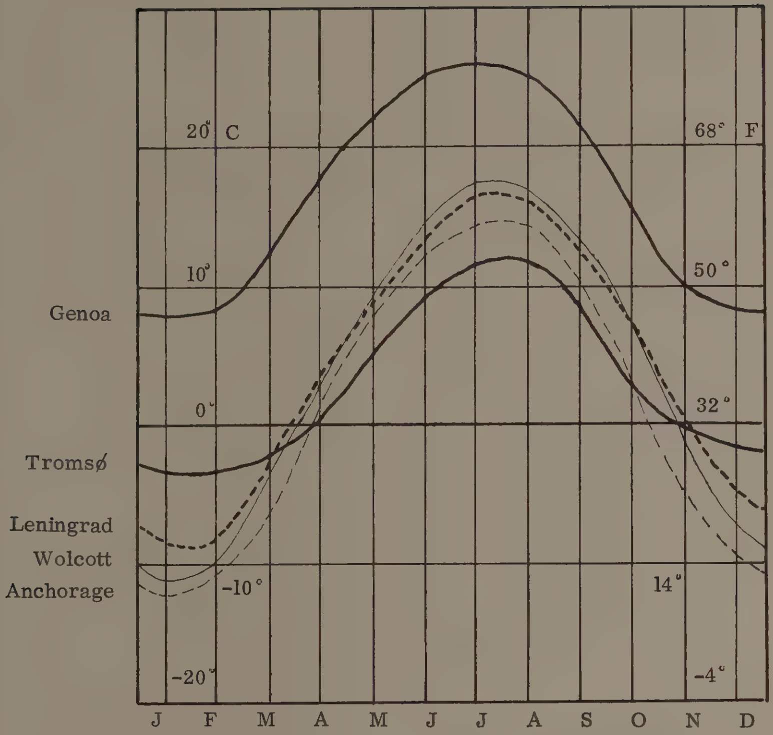
The Center is located in Wolcott, Vermont, a small community in the north central portion of the state. By automobile, Wolcott is about two and one half hours from Montreal, four hours from Boston, and six hours from New York. Airline connections can be made at either Barre-Montpelier or Burlington, each about one hour's drive from The Center. This part of Vermont is also easily reached from New York or Washington D.C. by AMTRAK service.

The terrain in the vicinity of The Center is typical northern New England hill country, with elevations ranging from about 600 feet above sea level in the river valleys to over 2,000 feet at the tops of nearby hills. The highest summits in the Green Mountains (over 4,000 feet) are about 25 miles to the west. The country around Wolcott is lightly populated; much of it is semi-wilderness, traversed only by a network of back country roads.

To fully appreciate the suitability of The Center's location for field studies relating to the environment of the Far North, it is necessary to understand the special climatic and biotic characteristics of northern New England.



The Center for Northern Studies is easily reached by road, rail, or air from most locations in the northeast.



Annual temperature regime for some northern stations. Genoa, Italy, at about the same latitude as The Center for Northern Studies, is shown for comparison. Note that Tromsø, Norway, far above the Arctic Circle has warmer winters than does Wolcott.

The headquarters of The Center for Northern Studies is actually a few miles nearer the equator than to the North Pole. However, northern New England is subject to an exceptional climate that is far colder, during both summer and winter, than is normal for these latitudes. In fact, climatic records kept in the vicinity of The Center indicate that the temperature regime is closely comparable to that of Anchorage, Alaska, or Leningrad, USSR, both of which are over 1,000 miles to the north.

At The Center, mean temperatures are above 10° C (50° F) for only four months of the year, while they are freezing or below for five months. Minimum temperatures in some locations reach 40 degrees below zero or colder during the average winter. Snow cover lasts four to six months and normally reaches a depth of several feet. Ponds are frozen for up to six months of the year.

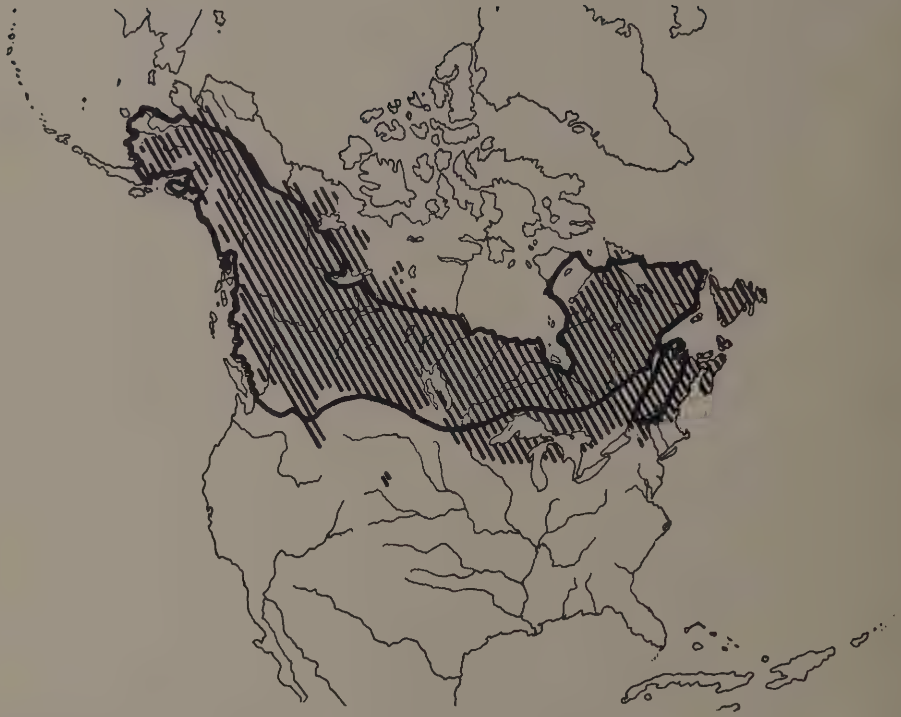
The ecological implications of this unusual climatic situation are considerable. For example, every species of tree native to the boreal forests of central Canada and Alaska occurs naturally in the vicinity of The Center. With only a few exceptions, the same is true for other woody plants. Almost every species of mammal typical of the boreal forest region has native populations in northern Vermont. The exceptions are mainly in the case of large mammals, which were eliminated from the area during settlement.

Many typical northern forest birds, such as the goshawk, boreal chickadee, and northern raven nest in the vicinity of The Center.

At low and middle elevations, then, the country in the vicinity of The Center for Northern Studies has a climate and supports a fauna and flora that is typical of the southern portion of the Subarctic. However, on the summits of the higher mountains, upper Subarctic and even Arctic conditions prevail. For example, the flora of the alpine tundra of the Presidential Range in New Hampshire is closely comparable to that of northernmost Labarador and southern Baffin Land. The areas of alpine tundra in New England, although small, are in many respects the most typically Arctic areas in the U.S. outside of Alaska.

In addition to the high alpine peaks, many areas at lower elevation in northern Vermont and New Hampshire support relict populations of arctic plants, left behind after the retreat of the glaciers.

The unusual climatic and biotic features of northern New England make it possible for The Center for Northern Studies to offer field courses and research opportunities under conditions that closely approximate those of high latitudes. For example, a field botany course taught at The Center and augmented by short field trips can give students field experience with most of the major elements of the boreal and Arctic flora. Should one of these students later travel to Alaska or Greenland,



Typical distribution patterns of Far Northern plants and animals. The range of the white spruce (Picea glauca) commonly the most important tree in the northern forest is cross-hatched. The range of the northern bog lemming (Synaptomys borealis) is enclosed in the heavy black line. The majority of widespread Subarctic species of animals and plants range into northern New England.

The Mt. Washington cog railway crossing the alpine tundra of the Presidential Range in northern New Hampshire. These mountains have a climate that is among the most severe in the northern hemisphere. They support an assemblage of typically arctic plants and small animals.

learning the flora of the area would involve mainly adding to an already strong background in the northern flora.

A particular advantage of The Center's location is its easy access in winter. Winter travel in the Arctic and Subarctic is often difficult, dangerous, and sometimes impossible. Thus, long term studies of the winter environment are rare. But The Center for Northern Studies can provide opportunities for many studies of this type within a ten minute walk or ski of its headquarters.

An important portion of any program of polar studies should include polar survival and travel. In this field, there is no substitute for experience. For several months of the year true polar conditions, often with high winds and temperatures far below zero, occur at The Center. True field experience in polar survival and travel can be obtained here.

FIELD FACILITIES

Land available for use for field work by The Center lies in two categories: that which is under direct control of The Center, and that which is owned by private individuals or other organizations, and which has been made available to The Center under contract for bona fide teaching and research projects.

The land under direct control of The Center comprises at this writing some 500 acres. We expect to add to this in the future. Most of the Center land is wild and undeveloped, and several exceptionally fine examples of typical northern environmental situations are found here.

Bear Swamp is a classic example of a boreal coniferous forest and muskeg. The central feature of the swamp is the tamarack brook, a meandering marshy waterway with several beaver ponds, and traversing extensive alder swamps. On both sides of the brook are typical peaty muskegs which contain a fine assemblage of boreal plants and animals. Black spruce, northern larch, and labrador tea are among the dominant species. Rarer plants include pitcher plant, dwarf mistletoe, and several species of orchids. As well as beaver, the swamp supports populations of fisher, otter, deer, and numerous small mammals.

A typical northern "muskeg", or lightly forested peatland in Vermont. Similar areas, with an almost identical flora and fauna, are found throughout the Subarctic.

Students on winter bivouac in northern Vermont, for training in winter survival techniques. Temperatures as cold as 30 to 40 degrees below zero Fahrenheit, high winds, and deeply drifted snow make conditions similar to those found in the Arctic.

Among the birds breeding in Bear Swamp are olive sided flycatchers, hudsonian chickadees, red breasted nuthatches, and white-throated sparrows. Raven nest nearby and are often seen in the swamp.

There are several access trails into the 200 plus acres under control of The Center. These are used mainly to allow researchers access to particularly interesting portions of the swamp, but they may also be used by small classes for field work.

Wolcott Pond is an undeveloped pond of some 75 acres. Virtually the entire watershed is forested, and the pond and its surroundings have changed but little since the days of colonization. The Center has control of a considerable portion of the shoreline and watershed of Wolcott Pond, and several research projects initiated by The Center have been or are being carried out on the pond and its surroundings. A superb stand of northern hardwood forest adjacent to Wolcott Pond is also under the control of The Center.

Private land available to The Center is less easy to describe, since the situation may change rapidly. It is safe to say that The Center has available, for research and teaching purposes, good examples of virtually every type of environmental situation naturally occurring in northern Vermont.

LONG TERM PROGRAMS

In general, the long term programs of The Center are concerned with building up the educational and research facilities of The Center. There are two phases to this program: one involves building up the library and museum collections, scientific and other equipment, and the physical facilities. A special aspect of this is the polar arboretum, which is discussed in some detail below.

The other phase is concerned with developing a detailed and profound understanding of the physical and biotic characteristics of the local environment. As well as being useful for teaching and research purposes, the "environmental inventory" will serve as a baseline against which possible future changes in the local environment can be plotted.

SHORT TERM PROGRAMS

The Center for Northern Studies also sponsors a wide variety of other programs, including scientific expeditions, courses, public lecture series, and field trips. Since the status of these programs changes from time to time, and new programs are being initiated, they are not discussed in detail here. Members are kept informed of these programs through our newsletter, The Raven, and special notices.

Long tailed jaeger. These graceful predators and scavengers of the Arctic tundra are found as far north as there is land. They feed largely on lemmings, and they are an important factor in the natural population control of these small rodents.

ARBORETUM AND LIVING POLAR FLORA

The flora of the tundra and the northern forest contains many species of great scientific interest, largely because of their broad range, great variability, and adaptations to extreme environmental situations. Many of the plants of the Far North are also breathtakingly beautiful, yet they are often so little known as to have no common name, at least in English.

Rhododendron camtschaticum is a dwarf species which carpets the tundra in parts of western Alaska and eastern Siberia. Each July brilliant patches of Rhododendron flowers spring up in the barren grounds, adding color to the whole landscape. We know of no attempts to grow or propagate this beautiful and striking plant outside its natural range.

Attempts to grow polar plants in temperate regions have generally met with little success. Oddly enough, one of the main problems has been winter hardiness. Most northern herbs and shrubs are normally protected by a layer of snow during most of the cold months. This snow layer not only acts as insulation, but it also protects plants from bright sunlight and rapid changes in temperature. It is these factors, rather than intense cold, that are often responsible for lack of hardiness in plants. Some northern trees, such as some fir species, are intolerant of the hot summers of temperate areas.

Because of the subarctic climatic regime prevalent at The Center's field location, it is possible to grow many far northern species under conditions similar to their native situation, and The Center has begun a project of this type. Plants successfully introduced from Far Northern areas, plus the many specimens occurring here naturally, constitute the main part of The Center's arboretum. This "living flora" is augmented by a rapidly growing herbarium, containing specimens of plants from throughout the polar regions. At present, the arboretum is used largely as a teaching facility. However, as it grows, its value for research purposes will increase. As well as working with polar plants, the arboretum has begun a program of introducing exotic species from temperate regions, in order to test which of these species may be useful for horticultural or other purposes in Northern Lands.

PUBLICATIONS OF THE CENTER

The Center for Northern Studies publishes a quarterly newsletter, *The Raven*, which is sent to all members and to institutions and individuals interested in the programs of The Center.

The Center will also publish, at irregular intervals, *Contributions of the Center for Northern Studies*, a vehicle for presenting the results of scientific, historical, or other studies done by the staff or students of The Center.

The Center also sponsors articles published in recognized journals as numbered contributions of The Center for Northern Studies.

MEMBERSHIP IN THE CENTER

Membership in The Center for Northern Studies is open to anyone interested in the programs and goals of The Center. Members are entitled to participate in various functions of The Center, to vote for officers, and to receive The Center's publications.

Annual membership is for the period of July 1 to July 1.

Dues (annual)

Regular membership	$15.00
Student membership	$5.00
Sustaining membership	$100.00 or more

It has been determined by our board of trustees that all membership dues above $5.00 are a contribution, and are therefore tax deductible.

In addition to individual membership, a participating institutional membership is available to universities, colleges, museums, and other institutions interested in participating in the programs of The Center. Information on this form of membership is available from:

The Director
The Center for Northern Studies
Wolcott, Vermont 05680

CONTRIBUTIONS

The Center for Northern Studies is recognized as a tax exempt, non-profit corporation by the U.S. Internal Revenue Service.

As well as financial contributions, The Center is pleased to accept gifts of books, museum specimens, and equipment. The Center is prepared to assist in the determination of the value of gifts of this sort for tax purposes.

CORPORATE STRUCTURE

The Center for Northern Studies is incorporated as a non-profit corporation for education and research under the laws of the State of Vermont. The corporation is afforded tax-exempt status as a non-profit corporation by the United States Internal Revenue Service.

Copies of the by-laws of the corporation and other information of the stated objectives, officers, and personnel of The Center for Northern Studies is available to members of The Center and other interested parties.

The wolf and the caribou are among the most characteristic large mammals of the Far North. Both have been eliminated from much of their original range in eastern North America.

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